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FURTHER OBSERVATIONS UPON THE ETI-
OLOGY, DIAGNOSIS AND TREATMENT OF
ACUTE AND CHRONIC APPENDICITIS,

*With the Report of Sixty-one Chronic Cases Operated upon,
with One Death.*

BY

JOHN B. DEEVER, M.D.,

ASSISTANT PROFESSOR OF SURGICAL ANATOMY IN THE UNIVERSITY OF
PENNSYLVANIA; PROFESSOR OF SURGERY IN THE PHILADELPHIA
POLYCLINIC; SURGEON TO THE PHILADELPHIA, GERMAN
AND ST. AGNES' HOSPITALS.

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SINCE the publication of my last papers on ap-
pendicitis, which appeared in THE MEDICAL NEWS
of May 19, May 26, and June 16, my further ex-
perience has more than convinced me that the
views then expressed have been borne out by the
results attained by the measures then advocated.
Further, I am prepared to express myself more
strongly than ever in favor of early operation in
acute primary attacks of appendicitis, and of opera-
tion in all cases of chronic appendicitis, including
under this heading the sub-acute, the relapsing, and
the recurrent varieties.

As regards etiology, I would emphasize the views
I have already expressed regarding the importance
of foreign bodies as a factor in the causation of a
large proportion of acute and of a smaller number
of chronic cases. In the great majority of the
latter the condition found is that of a chronic

catarrhal inflammation, while the bulk of acute cases is due largely to foreign bodies, *i. e.*, fecal concretions and extraneous substances. I have only seen two cases in which real foreign bodies were not found. In one, an acute case, the appendix contained a large number of strawberry-seeds; in the other, a chronic case, the appendix had contained a date-seed which had escaped at the point of ulceration. It was found above the tip of the appendix, which pointed north and lay behind the colon.

I believe that all cases of appendicitis begin as a catarrhal inflammation, in which the bacterium *coli commune* plays an important causative rôle. After this inflamed condition of the appendix has been established, the future outcome of the case, pathologically, very frequently depends upon the presence of a fecal concretion or foreign bodies and bacteria of suppuration other than the bacterium *coli commune*. No definite rule can be laid down, because there are cases that illustrate both conditions. It has been my experience that in acute perforative, and frequently in non-perforative, cases fecal concretions were found to exist either within the organ or in its immediate neighborhood.

I have already made the statement that the diagnosis of appendicitis is not difficult in the vast majority of cases. I am now more than ever convinced of the truth of this statement and of the importance it bears to successful treatment. The history of the case and the localized signs that center around that most valuable landmark known as McBurney's point are always sufficient to establish the diagnosis either directly or by exclusion.

The acute cases that go on to suppuration, and in which there is the greatest tendency for the pus to become circumscribed, are those in which the appendix points toward the northern end of the appendiceal compass and lies between the layers of the mesocolon.

The palpation of the appendix in chronic cases is a valuable and reliable means of diagnosis. Of course, in those cases in which the organ lies behind the cecum the method is less valuable, although it is even then of service, because when the cecum is distended the condition is due to flatus and not to feces. This has been my experience in the sixty-one chronic cases upon which I have operated, to say nothing of a much greater number of acute cases. I have been able to diagnosticate and demonstrate by operation a thickened appendix, giving its direction and location and its depth from the anterior wall of the abdomen. Women are better subjects, but the method is applicable to men, especially if they have been the victims of repeated attacks of appendicitis. In chronic cases I have noted that upon palpation over the base of the appendix the pain is referred in a direction corresponding to the long axis of the organ, *i. e.*, when the pain is referred to the liver the appendix points north, and so on, corresponding to the different positions that the appendix holds.

The difficulty attending the differential diagnosis between chronic appendicitis and incipient psoas-abscess, that is before the pus has passed any distance down the psoas-sheath, I have had forcibly brought to my mind recently in two cases. The chief points in favor of a forming psoas-abscess are the appear-

ance of the patient, usually that suggestive of tuberculosis, the information to be obtained by an examination of the spine, a complete temperature-record, and a tendency to flexion of the thigh of the affected side. While the last-mentioned sign may be and is present in some cases of chronic appendicitis, it is a far more frequent accompaniment of psoas-abscess. Palpation will, in the great bulk of cases of chronic appendicitis, determine the presence of a diseased appendix, while deep pressure over the right iliac fossa will in case of psoas-abscess, although revealing tenderness, fail to disclose the presence of either a diseased appendix or the characteristic rigidity of the flat muscles of the abdominal walls.

As regards treatment, my rule is this : Given the case of a patient who suddenly develops severe abdominal pain, at first referred either to the epigastrium or about the umbilicus, and later to the right iliac fossa, accompanied by nausea and vomiting, and following some dietary excess or indiscretion, and preceded as a rule by a history of intestinal dyspepsia, and when examination reveals rigidity and tenderness over McBurney's point, I at once administer a purgative, preferably castor-oil or salts. If this is not retained I give calomel. If after the purgative has operated satisfactorily the symptoms continue, along with an increase of intensity of the localized tenderness, I at once operate. The three cases that follow will illustrate my statement and prove my theory to be sound, and the procedure a life-saving measure.

CASE I.—On the evening of June 26, 1894, I was called to see Dr. J. H. B., aged forty-five, one of our leading practitioners. I found him suffering with acute abdominal pain, most intense in the right iliac fossa, the character of which I recognized as that of appendicular colic. He gave a history of chronic intestinal dyspepsia extending back for a period of years, also a vague history of having suffered in the past from a slight attack of appendicitis. Three days prior to my visit he had suffered from an acute attack of indigestion, the result of indiscretion in diet, which had been somewhat relieved by active purgation. The day of my visit he had had several bowel-movements, yet the pain in the right iliac fossa, which was paroxysmal, was increasing in intensity, notwithstanding the fact that he had taken, upon his own responsibility, one-fourth of a grain of morphin. Physical examination of the abdomen convinced me that the man was suffering from an acute, progressive attack of appendicitis. I advised immediate operation, and at 8 o'clock the following morning I removed the acutely inflamed appendix, the mesenteric attachment of which was gangrenous in its distal half. Recovery was uninterrupted.

CASE II.—Dr. J. C. R., aged twenty-two, resident physician in the German Hospital, while on duty was taken sick on the evening of August 30, 1894, with severe general abdominal pain, soon becoming localized in the right iliac fossa. Under active purgation he was somewhat relieved, but the appendicular pain persisted. On the evening of the 31st I was asked to see the patient by Dr. Frese, the chief resident physician of the hospital, who informed me that in his judgment the doctor was not so well, and he feared the case was progressing unfavorably.

I confirmed Dr. Frese's diagnosis of acute appendicitis and advised immediate operation.

The operation was done at 8 P.M. The appendix occupied the southwest position and was bound down by adhesions. It was gangrenous and about to perforate; it contained a small collection of pus at its tip. Recovery was uninterrupted.

CASE III.—During the early part of the past summer I was called to see Mrs. B., the wife of a prominent Philadelphia physician, who was suffering from what was believed to be appendicitis. She was at the same time suffering from uterine hemorrhage, which from its severity and from the fact that it was associated with acute paroxysmal abdominal pain, raised the question of extra-uterine pregnancy. Vaginal examination demonstrated a point of excessive tenderness high up and to the right, but otherwise was negative. I confirmed the diagnosis of appendicitis, and we decided upon active purgation. This not being followed by abatement of her symptoms, operation was advised. The appendix lay southwest, was adherent, very much enlarged, and contained a considerable amount of pus. The surrounding tissues were covered with inflammatory lymph. Recovery was uninterrupted.

In this connection it is interesting to note that this was the third member of the family upon whom I had operated for appendicitis.

CASE IV.—I recently saw in consultation a young lady with appendicitis in whom the symptoms had not yielded to purgation; the appendix was so palpable that it was believed to lie in contact with the anterior parietal peritoneum. Operation was advised. The appendix was found acutely inflamed and in contact with the anterior parietal peritoneum. Recovery was uninterrupted.

I report the following two cases of acute appendicitis to illustrate the frightful rapidity with which such cases may go from bad to worse if not operated upon very early. The only possible hope of recovery in such cases lies in immediate operation, as they that do not show decided improvement with marked amelioration of all symptoms, especially of tenderness, after the administration of purgatives.

CASE I.—Mr. R., twenty-eight years of age, was attacked fifty hours before operation. The symptoms grew steadily worse in spite of all medication. When the belly-cavity was opened pus welled up in the wound in quantities. The appendix, which pointed northeast, was gangrenous and had separated from its attachment to the cecum, which also was gangrenous, leaving a large hole in the latter, through which fecal matter was escaping. The opening in the cecum was closed with difficulty. The peritoneal cavity was carefully and thoroughly washed out and drained with glass tube and gauze. The patient died on the third day following the operation.

At the post-mortem examination the external wound was found in good condition, and the glass and gauze drainage still in position. The omentum was congested and infiltrated, presenting the appearance of a cock's comb, and was adherent to the lower end of the cecum around the drainage-tube. All the tissues in the right iliac fossa were in a semi-gangrenous state. The cecum around the opening found at the operation was gangrenous; the stitches, however, were still in position. To the inner side of the row of sutures the bowel was perforated, allowing the escape of feces and pus. The general peritoneal cavity

| Name. | Age. | Sex. | Date. | Number of attacks. | Condition of bowels. | Position of appendix. | Pus. | Adhesions. | Manner of treating stump. | Result. | Remarks. |
|---------------------|----------|----------|--------------------------|--------------------|----------------------|-----------------------|-----------|-------------|---|---------|---|
| D. R. | 34 | M. | 1890 July 20 1891 | 2 | Constipated | S. W. | Yes | Yes | Tied off. | Rec. | Abscess-cavity walled off. |
| A. B. F. F. | 9 28 | F. M. | Sept. 12 1892 1893 | 1 1 | " Normal | N. N. | " " | " " | " " | " " | Appendix partially gangrenous. Abscess-cavity walled off. |
| L. F. W. I. | 30 35 | M. M. | April 11 May 3 | 1 1 | Constipated | N. E. N. | " No | " Slight | " " | " " | " " " " Mucous and submucous coats greatly thickened. |
| R. S. B. Mrs. K. | 25 25 | M. F. | May May | 2 1 | | S. E. S. | " Yes | " " | " " | " " | Long meso-appendix. Pain in right iliac fossa since acute attack ; in bed for nineteen weeks prior to operation ; short appendix. |
| C. N. E. B. P. | 39 50 | M. M. | Aug. 14 Aug. 19 | 4 5 | Diarrhea " | S. N. E. | No Yes | Firm " | " " | " " | Appendix tightly bound down by adhesions. Ulceration, with purulent collection in appendix. |
| Mrs. B. | 30 | F. | Dec. 29 1894 | 1 | Constipated | S. W. | No | Numerous | " | " | Appendix gangrenous. |
| T. W. | 28 | F. | Jan. | 2 | Diarrhea | S. W. | " | Slight | " | " | Two coproliths. |
| A. M. | 17 | F. | Jan. 2 | 1 | Normal | N. | " | No | " | " | Appendix post-cecal. |
| I. R. | 21 | F. | Jan. 20 | 1 | Constipated | S. | " | Slight | " | " | Long meso-appendix. |
| L. V. | 49 | F. | Jan. 30 | 3 | Diarrhea | S. | " | Firm | Circular amputation stump invaginated. | " | Appendix short, bound down. |
| M. C. | 23 | F. | Feb. 8 | 1 | | S. E. | Yes | Slight | " | " | Appendix thickened. |
| C. F. Z. | 23 | M. | Feb. 8 | 2 | Constipated | S. E. | " | Firm | Tied off. | " | Adhesions to omentum. |
| J. McC. | 19 | M. | March | 3 | | N. | " | " | Circular amputation, stump invaginated. | " | Appendix bent, twisted, gangrenous. |
| S. F. M. S. | 30 60 | M. F. | March March | 4 1 | | N. W. S. W. | No " | " Num- | " " | " " | Adhesions entirely surrounding appendix. Long meso-appendix |

| | | | | | | | | | | | | |
|----------|----|----|----------|----|-------------|-------|-----|---------------|---|---|---|--|
| H. E. W. | 26 | M. | April 4 | 3 | " | N. W. | " | " | " | led oil. | " | Sinus in right lumbar region leading to orifice in appendix. |
| L. W. G. | 31 | M. | April 7 | 1 | Constipated | N. | Yes | " | " | Circular amputation, stump invaginated. | " | Tip adherent to cecum, ulceration at point of contact; stump with margin of cecal ulcer invaginated. |
| E. B. | 27 | F. | April 17 | 3 | Diarrhea | S. W. | No | No | " | " | " | Appendix enveloped in wall of omentum. |
| L. P. B. | 38 | M. | April 18 | 1 | | N. W. | Yes | Firm | " | " | " | Appendix very long. |
| H. G. | 58 | M. | April 21 | 3 | | S. | " | No | " | " | " | Appendix twisted and gangrenous. |
| H. O. | 35 | F. | April 29 | 2 | Constipated | S. E. | No | Num- erous | " | " | " | Abscess-cavity walled off. |
| L. C. | 53 | F. | April 30 | 1 | Diarrhea | N. | " | Slight | " | " | " | Appendix enlarged. |
| E. T. | 14 | M. | May 3 | 1 | Constipated | S. | " | Firm | " | " | " | Walls infiltrated. |
| G. G. | 50 | M. | May 16 | 10 | " | N. E. | " | Yes | " | " | " | Appendix adherent to mesentery; during acute attack passed cast of appendix. |
| S. C. | 22 | F. | June 4 | 2 | Diarrhea | E. | " | " | " | " | " | Pain referred to left side, subjective symptoms in right iliac fossa; tip of appendix attached to peritoneum to left of median line. |
| H. P. | 37 | F. | May 24 | 5 | " | N. E. | " | " | " | " | " | Long meso-appendix; appendix contained pus. |
| Mrs. B. | 34 | F. | May | 1 | Constipated | S. | Yes | No | " | Tied off. | " | Appendix thickened at distal end. |
| M. E. | 25 | F. | May | 1 | " | S. W. | No | " | " | Circular amputation, stump invaginated. | " | |
| R. C. Y. | 26 | M. | June 7 | 3 | " | S. E. | " | Yes | " | " | " | Tuberculous. |
| R. S. | 19 | M. | June 12 | 1 | Diarrhea | S. E. | " | No | " | " | " | Appendix had sloughed. |
| McI. | 30 | M. | June 10 | 1 | Constipated | N. E. | Yes | Yes | " | Tied off. | " | |
| J. M. | 26 | M. | June 16 | 4 | " | N. | No | No | " | Circular amputation, stump invaginated. | " | |
| J. McF. | 27 | M. | June 25 | 9 | " | S. | " | Many | " | " | " | First attack fourteen years ago; suffered since with entero-colitis; disappeared since operation. |
| J. H. B. | 45 | M. | June 27 | 1 | " | N. W. | " | No | " | " | " | Meso-appendix gangrenous. |
| R. M. | 30 | M. | June 28 | 3 | " | S. E. | Yes | Yes | " | Tied off. | " | Omentum gangrenous, tied off and re-moved. |

| Name. | Age. | Sex. | Date. | Number of attacks. | Condition of bowels. | Position of appendix. | Pus. | Adhesions. | Manner of treating stump. | Result. | Remarks. |
|----------|------|------|----------|--------------------|----------------------|-----------------------|------|------------|---|---------|--|
| 1894 | | | | | | | | | | | |
| E. C. | 21 | M. | June 26 | 1 | Normal | N. | No | Yes | Tied off. | Rec. | |
| J. D. | 17 | F. | July 3 | 1 | Constipated | .. | Yes | " | | " | |
| E. C. | 26 | F. | July 11 | 2 | " | S. | " | No | Tied off. | " | |
| C. S. B. | 22 | M. | Aug. 5 | 7 | Normal | N. | No | Yes | Circular amputation, stump invaginated. | " | Appendix much twisted; post-cecal. |
| M. G. | 12 | F. | Aug. 9 | 2 | Constipated | N. | Yes | " | " | " | |
| H. E. | 34 | M. | Aug. 10 | 1 | " | S. W. | No | " | " | " | |
| H. S. | 27 | M. | Aug. 26 | 1 | Normal | N. | Yes | " | Tied off. | " | Appendix had sloughed from cecum; stump invaginated. |
| W. S. | 18 | M. | Aug. 27 | 2 | Constipated | S. W. | No | No | Circular amputation, stump invaginated. | " | |
| Mrs. W. | 24 | F. | Aug. 28 | 2 | " | N. | Yes | Yes | Tied off. | " | Invaginated. |
| Mrs. F. | 32 | F. | Sept. 4 | 2 | " | S. E. | No | " | Circular amputation, stump invaginated. | " | Appendix long, clubbed at end. |
| C. W. | 22 | F. | Sept. 12 | 6 | " | S. | " | No | " | " | Thickened appendix. |
| B. McK. | 22 | F. | Sept. 26 | 4 | " | S. | " | Yes | " | Died | Adhesions very dense; appendix surrounded by inflammatory lymph; patient died of peritonitis. |
| J. N. | 24 | F. | Oct. 3 | 4 | " | S. | " | " | " | Rec. | Fecal concretion at tip. |
| J. A. | 30 | M. | Oct. 6 | 16 | " | S. | " | " | " | " | Appendix short. |
| F. N. | 22 | M. | Oct. 11 | num- erous | " | S. | " | No | " | " | Repeated attacks for two years; appendix very long. |
| N. M. | 28 | M. | Oct. 17 | 7 | " | S. | " | Yes | " | " | Appendix completely twisted on itself; free bleeding during operation; glass and gauze drainage. |
| J. R. | 43 | M. | Oct. 18 | 3 | " | S. E. | Yes | No | " | " | |
| L. F. | 23 | M. | Oct. 23 | 3 | " | S. W. | No | " | " | " | |
| | 30 | M. | Oct. 24 | 2 | " | S. E. | Yes | Yes | Tied off. | " | |

was infected, but contained very little pus; there was no pus in the pelvis. The intestines were covered with lymph. The cause of death was septic peritonitis.

CASE II.—Mr. K., aged twenty-three, was attacked May 23 with severe abdominal pain, referred to the epigastrium, and soon becoming localized in the right iliac fossa. Tenderness was marked and persistent, and on the 25th was intense, accompanied by exaggeration of all the symptoms, local distention, vomiting, and constipation. Operation was undertaken on May 28th. When the peritoneum was opened a considerable quantity of pus escaped. The cecum was distended with gas, and the small intestines were injected, but not paralyzed or distended. The appendix, which occupied the northeast position, was brought into view and tied off. The meso-appendix was short, and was attached to the basal half of the organ; perforation had taken place at about the middle third; the appendix beyond was gangrenous. There were no adhesions, and apparently no attempt upon the part of nature to close off the general peritoneal cavity. The pus cavity was thoroughly washed out, but upon placing glass drainage in the pelvis fully a pint more of pus escaped. The patient made a rapid and safe recovery.

The amount of pus, especially that in the pelvis, and the absence of any apparent attempt upon the part of nature to protect the general peritoneal cavity, and the recovery of the patient, point conclusively to the fact that with proper technique the general peritoneal cavity under these circumstances can be protected against infection, and the case brought to a successful issue.

In connection with this paper I report 61 cases of

operation for chronic appendicitis, with one death. The fatal case was the following :

B. K., a female, aged twenty-two, born in Ireland, was admitted to St. Agnes' Hospital, September 19, 1894, with a history of four previous attacks of appendicitis. At the time of admission to the hospital she complained of pain in the right iliac fossa. The tenderness in this region was so great upon slight pressure as to preclude a thorough examination. The greatest tenderness was at the McBurney point. Immediately beneath the right semi-lunar line, and within the abdomen, a large mass was felt. The patient suffered from retention of urine, requiring catheterization.

Upon opening the peritoneal cavity an immense mass came into view, composed of the small and large intestine and omentum, bound firmly together by dense adhesions. The omentum was ligated in sections and cut away. The adhesions were carefully broken up, exposing the cecum imbedded with the appendix in an inflammatory mass. After a tedious dissection the cecum and appendix were freed, and the latter ligated and removed.

I beg to call attention particularly to this case on account, first, of the number of attacks ; second, the condition found at the time of operation ; and, third, the result. Had the patient been operated upon early in or after the primary attack, the result would doubtless have been different. If the appendix had been removed at this time the inflammatory mass found in the right iliac fossa would not have been present, and such an extensive dissection not rendered necessary.

The rôle the appendix plays in many cases of in-

testinal indigestion I am sure is important. This has been beautifully shown in many of the cases of chronic appendicitis I have operated upon for digestive symptoms, which were so persistent before the appendix was removed, and entirely disappeared after recovery from the operation. I am so thoroughly convinced of the importance of this fact that I believe a permanent cure can only be obtained in a certain proportion of cases of chronic intestinal catarrh by removal of the appendix, should it reveal tenderness, even when there has been no clear history of an attack of inflammation of this organ.

In my record of operations for chronic appendicitis are included three cases in which was present chronic diarrhea with mucous stools, and in one also blood. In two of these cases the diarrhea, along with other evidences of intestinal disturbance, disappeared six months after operation. In the third case, operated upon five months ago, while there is still diarrhea, it is improving. This case is of special significance from the fact that, although the patient had received most exhaustive and prolonged treatment, both internal and local, at the hands of expert medical men, yet the diarrhea proved rebellious. I believe this case will, as have the others, entirely recover.

In closing, I wish to emphasize the important deductions that have forced themselves upon me. The first and most important of all is the necessity of early operation for those cases of acute appendicitis, whether in the initial attack or in an acute attack supervening upon a chronic appendicitis not

immediately yielding to judicious purgation. The ravages of this affection are so rapid and so fatal that I can hardly express myself too strongly upon this point. I hear so often from medical men and the more conservative surgeons that appendicitis is amenable to medicinal measures, yet when they call in the consulting surgeon for those of their cases which do not improve, how often are they found beyond surgical aid? How often are we called in at the last moment to see supposed cases of obstruction of the bowels or idiopathic (?) peritonitis, only to find the patient moribund, with cold, blue extremities, in fact profoundly septic, the victim of a perforative appendicitis! I could cite instance after instance in which patients have died of inflammation of the bowels, peritonitis, obstruction of the bowels, and in one instance of "heart-failure," only to discover at the autopsy a gangrenous and perforated appendix, with a belly full of stinking pus. In looking over the weekly mortality-reports of the Philadelphia Board of Health I have often been struck with the fact that appendicitis does not figure as a cause of death. If autopsies were made in the cases in which death is recorded as due to "peritonitis," "inflammation and obstruction of the bowels," etc., I am certain that appendicitis would be found the primary cause of death in a large majority of cases so reported. The honest physician or surgeon who is open to conviction cannot but be convinced of the truth of my statements. One attack of appendicitis is almost sure to be followed by others. Each and every subsequent attack lessens

the patient's chances for ultimate recovery—and why? Inflammation of the peritoneum leaves adhesions and inflammatory lymph; leaves an appendix the subject of chronic catarrhal inflammation which forms a fruitful soil for the development of bacterial life. Such an appendix is, in my opinion, the starting-point for a large percentage of the chronic intestinal troubles so commonly seen.

In view of these deductions, and the fact that the mortality of the operation for chronic appendicitis is practically *nil*, I must say that the safest and most logical procedure is operation. The golden opportunity is in the primary attack as soon as the diagnosis is established, thus eliminating the possibility of perforation, gangrene, pus, and general peritonitis. Should this opportunity be lost, and the patient recover from the attack, I strongly advise the removal of the appendix as soon as possible.

By asepsis and careful technique the operation can be done with but little risk to life, as has been proved by such men McBurney, Richardson, Bull, Fowler, and others. In further support of this I herewith tabulate sixty-one cases of operation for chronic appendicitis, with one death.

